

FLUID VISCOUS DAMPER-BASED SEISMIC RETROFIT STRATEGIES OF STEEL STRUCTURES: GENERAL CONCEPTS AND DESIGN APPLICATIONS

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ABSTRACT: Two advanced seismic protection technologies, represented by a dissipative bracing system and a damped cable system, both incorporating fluid viscous dampers as passive control devices, are examined with special reference to their use in retrofitting steel structures. The essential characteristics and performance of the dampers and the two technologies, along with their analytical and computational modelling criteria, are recalled in the first part of this paper. A demonstrative design study concerning the application of both systems to an Italian pre-normative steel school building is then presented, by discussing the mechanical parameters, dimensions, layouts and locations selected for the relevant constituting elements. The advantages of the two rehabilitation hypotheses are assessed in terms of the mutual performance objectives formulated at a preliminary design stage, based on the results of the modal and non-linear dynamic analyses carried out during the final verification phase. Structural implementation and technical installation details are finally provided for both retrofit solutions.